Remarks

In the office action mailed March 7, 2006, claims 1, 3 and 5 - 9 are rejected under 35 U.S.C. §102(e) over U.S. Patent No. 5,218,471 (to Swanson et al.), and claims 1 - 20 are rejected under §102(e) over U.S. Patent Application Publication No. 2004/0069957 (to Menon et al.).

Claim 1 is directed to a method of forming an array of focusing elements and includes, in part, the steps of conducting lithography on a substrate at a first location using a first set of exposure characteristics to form a first resist area, and conducting lithography on the substrate at a second location using a second set of exposure characteristics to form a second resist area having a thickness that is different than a thickness of the first resist area. As disclosed in the application, the use of such a variable resist permits the formation of individual focusing elements that may vary substantially in depth.

The Swanson et al. reference discloses multilevel diffractive optical elements that provide phase Fresnel zone plates. The phase Fresnel zone plates are disclosed to be formed, however, by the use of successive masks and ion etching. The masks are formed by electron beam lithography (Swanson et al., col.4, lines 60 - 61), and the ion etching is achieved to selected depths by the successive use of different masks (Swanson et al., col.5, lines 28 - 38). The Swanson et al. reference does not disclose a process by which a resist is selectively exposed to varying depths due to varying sets of exposure characteristics. The Swanson et al. reference, in fact, states that "the technology to produce the continuous phase profile of FIG. 1a does not exist (Swanson et al., col.2, lines 56 - 57). As disclosed in the present application, processes of the invention may be use to provide three-dimensional profiles in one step, and the profiles may have continuous sloping or curved surfaces as shown in Figures 2, 4, 5. 6A, 6B, 6C, 6D and 7A.

Moreover, the exposure of a resist in Swanson et al. is not the same as ion etching for a desired prior of time to achieve a desired etch depth. The lithography steps in claim 1 are employed to provide a varying depth of *exposure* in a *resist*, not to provide varying *etching* depths. This difference is significant because it is the formation of a multilevel resist that permits the fabrication of three-dimensional profiles in one step without the need for multilevel alignment. The method of Swanson et al. clearly requires alignment of masks (Swanson et al., col. 5, lines 36 - 45).

As claimed in claim 1, the invention involves conducting lithography on the substrate at a first location using a first set of exposure characteristics to form a first resist area, and conducting lithography on the substrate at a second location using a second set of exposure characteristics to form a second resist area having a thickness that is different than a thickness of the first resist area. The disclosure of Swanson et al. does not disclose, teach or suggest such a process because Swanson et al. discloses using successive masks and ion etching wherein each etching is to a uniform thickness. The step-wise varying depth in Swason et al. is provided by the successive use of different masks. In accordance with the invention as claimed in claim 1 on the other hand, the varying depth is provided by different exposure characteristics and the process provides different resist areas of different thicknesses.

The Menon et al. reference has an earliest priority filing date of July 22, 2002, published on April 15, 2004 as US 2004/0069957, and issued on November 1, 2005 as US 6,960,773. The present application has an earliest priority filing date of October 3, 2002. The present invention, however, was conceived and reduced to practice prior to July 22, 2002. As evidenced by the enclosed Affidavit under 37 C.F.R. §131 executed by each of the inventors, the date of conception of the invention was at least as early as August 1, 2001 (§131 Affidavit, ¶3, Exhibit A), and the date of actual reduction to practice was at least as early as February 15, 2002 (§131

Affidavit, ¶4, Exhibit B). The applicant's exercised diligence in reducing the invention to practice between August 1, 2001 and February 15, 2002 (§131 Affidavit, ¶5), and continued to exercise diligence through filing a provisional application on the invention on October 3, 2002 (§131 Affidavit, ¶5), and further through filing the present non-provisional application on October 2, 2003 (§131 Affidavit, ¶5).

Applicants respectfully urge therefore, that the Menon reference is not prior art to the present application.

Claim 1, therefore, is submitted to be in condition for allowance. Each of claims 2 - 9 depends directly from claim 1, and is also submitted to be in condition for allowance.

Independent claim 10 is directed to a method that includes the steps of providing a substrate with hydrogen silsesquioxane, and providing a pattern via lithography in the substrate. The disclosure of Swanson et al. does not disclose, teach or suggest such a process because Swanson et al. does not disclose either the use of hydrogen silsesquioxane or the use of lithography. Claim 10, therefore, is submitted to be in condition for allowance Each of claims 11 and 12 depend from claim 10 and further limit the subject matter thereof. Each of claims 10 - 12, therefore, is submitted to be in condition for allowance.

Independent claim 13 is directed to a method that includes, in part, the steps of providing a first pattern via lithography in a substrate, depositing a conductive absorber material on the substrate, and applying an electrical potential to at least a first portion of the conductive absorber material, leaving a second portion of the conductive material with a different electrical potential. The disclosure of Swanson et al. does not disclose, teach or suggest such a process because Swanson et al. does not disclose the deposition of a conductive absorber material on a substrate, or the application of an electric potential to a portion of a substrate, or the use of lithography in general. Claim 13, therefore, is submitted to be in condition for allowance. Each of claims 14 - 18 depend from claim 13 and further limit the subject matter thereof. Each of claims 13 - 18, therefore, is submitted to be in condition for allowance.

Independent claim 19 is directed to a method that includes, in part, the steps of providing a first pattern via lithography in a substrate including hydrogen silsesquioxane, depositing a conductive absorber material on the substrate, applying an electrical potential to at least a first electrically continuous portion of the conductive absorber material, leaving a second electrically discontinuous portion of the conductive material with a different electrical potential, and wet etching the second portion of the conductive material to provide a first pattern on the substrate that is aligned with the first portion of the conductive absorber material. The disclosure of Swanson et al. does not disclose, teach or suggest such a process because Swanson et al. does not disclose the use of hydrogen silsesquioxane, or the deposition of a conductive absorber material on a substrate, or the application of an electric potential to a portion of a substrate, or the use of lithography in general. Claim 19, therefore, is submitted to be in condition for allowance. Claim 20 depends from claim 19 and further limits the subject matter thereof. Claims 19 and 20, therefore, are submitted to be in condition for allowance.

Each of claims 1 - 20 is submitted to be in condition for allowance. Favorable action consistent with the above is respectfully requested.

Respectfully submitted,

William E. Hilton
Registration No. 35,192
Gauthier & Connors LLP
225 Franklin Street, Suite 2300
Boston, Massachusetts 02110
Telephone: (617) 426-9180, Ext. 111